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TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: **P1999S007**

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): **10/089311**

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/10185	**18 October 2000 (18.10.00)**	**29 October 1999 (29.10.99)**

TITLE OF INVENTION

FUEL OIL COMPOSITIONS WITH IMPROVED COLD FLOW PROPERTIES

APPLICANT(S) FOR DO/EO/US

COCHRANE, Heather D.; CLOKE-BROWN, Veronica

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is the **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is the **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application number PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☒ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1 97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information:

PCT Request Form (Form PCT/RO/101) and Filing Receipt (Form PCT/RO/105, Copy of the International Search Report (PCT/ISA/210), Copy of Form PCT/IB/301, Copy of PCT Application as published, Copy of Form PCT/IB/308, Copy of the International Preliminary Examination Report (PCT/IPEA/416

27810

PATENT TRADEMARK OFFICE

JC15 Rec'd PCT/PTO 27 MAR 2002

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/089311	PCT/EP00/10185	P1999S007

21. ☒ The following fees are submitted:	CALCULATIONS PTO USE ONLY	
BASIC NATIONAL FEE (37 CFR 1.492(a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... **$1040.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .. **$890.00**		
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$750.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**		
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**		
ENTER APPROPRIATE BASE FEE AMOUNT =	**$890.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☒ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$130.00	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	$	
Total claims	14- 20 =	0	x **$18.00**	$0.00	
Independent claims	2- 3 =	0	x **$84.00**	$0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$280.00**	$280.00	
TOTAL OF ABOVE CALCULATIONS =				**$1300.00**	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2. +				$0.00	
SUBTOTAL =				**$1300.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f))				$0.00	
TOTAL NATIONAL FEE =				**$1300.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$0.00	
TOTAL FEES ENCLOSED =				**$1300.00**	
				Amount to be refunded:	$
				charged:	$

a. ☐ A check in the amount of $_____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. **05-1330** in the amount of $1300.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **05-1330**. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING**: Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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FUEL OIL COMPOSITIONS WITH IMPROVED COLD FLOW PROPERTIES

This invention relates to fuel oil compositions, especially middle distillate fuel oil compositions, with improved flow properties.

It is important that fuel oil compositions, especially middle distillate oil compositions such as automotive diesel oils, heating oils and gas oils (hereafter collectively referred to as "fuel oil" for convenience) retain their flow properties at relatively low temperatures. The main cause of such loss of flow properties is due to the formation of wax which tends to precipitate out and agglomerate thereby plugging burner and vehicle fuel filters and hence impairing flow. The temperature at which the wax starts to appear is termed the cloud point of the fuel. The cold filter plugging point (CFPP) is recognised as a measure of the operability of a fuel and the temperature at which a fuel will start to block vehicle filters. It is generally less than or equal to the cloud point of the fuel. This problem has been well recognized in the art and has hitherto been mitigated by the use of various flow improving additives also known as middle distillate flow improvers (MDFI) which reduce the CFPP of responsive fuels. One such example is Paraflow® 240 (commercially sold by Infineum). The flow improvers can change the size or the shape of the crystals as they precipitate out of the oil at low temperatures thereby allowing them to pass through the vehicle filter easily and avoid blockage of the fuel filter of the vehicle. Either way, it is important that the flow properties of the fuel oils are maintained.

Hitherto, crude oil was refined into motor gasoline, automotive diesel oils (hereafter "ADO") and gas oils used as heating oils (fuel oils) and their respective specifications were such that it was possible to easily treat ADO, gasoil and heating oils. However, recent legislation to minimise the amount of sulphur and also constrain other properties, eg density, in ADOs has meant that some of the heavier components of ADOs, such as e.g. catalytically cracked heating oils, have been displaced into the gasoil and heating oil fractions. These changes in the composition of ADO, gasoils and heating oils may mean that the effectiveness of conventional cold flow improvers such as Paraflow® 240 is lessened.

It is an object of the present invention to improve the flow properties of fuel oils (as herein defined) containing conventional flow improvers by incorporating therein a heavy catalytically-cracked naphtha.

Accordingly, the present invention is a fuel oil composition having improved cold-flow properties, said composition comprising a cold flow additive and the following components from various pipestills of a petroleum crude refinery process:

a. A relatively heavy fraction from a catalytically cracked heavy gasoil in turn derived from an atmospheric or vacuum pipestill, said fraction having a boiling range of 170 to 380°C in an amount of 3 to 20% by weight and

b. A gasoil product from an atmospheric pipestill, said product having a boiling range of 225 to 360°C in an amount of 30-50% by weight,

characterized in that components (a) and/or (b) in said composition is at least partially replaced by at least one relatively light naphtha fraction (c) from the atmospheric or vacuum pipestills, said light fraction (c) having a boiling range of 130 to 235°C and being present in an amount of 3 to 20% by weight, all weights being based on the total weight of the fuel oil composition.

In the fuel compositions of the present invention, the various components referred to are all derivable from various process streams of a petroleum crude refinery process. Such methods are well known in the art and are described in detail, for instance, by Keith Owen and Trevor Colley in "Automotive Fuels Reference Book", Second Edition, published by the Society of Automotive Engineers, Inc, Warrendale, PA, USA (1995). Specifically referred to are Chapter 3 of this text-book at pages 29-49 and Chapter 16 at pages 419-469 and 865-890, the latter pages forming Appendix 12 which is a 'Glossary of Terms' used in this art. Thus, reference to component (a) means a heavy fraction produced by catalytic cracking of heavy gas oil from the atmospheric or vacuum pipestill. This fraction suitably has a boiling point in the range from 184 to 376°C. This fraction is suitably present in the compositions of the present in an amount ranging from about 5-18 % by weight of the total fuel oil composition.

In the fuel oil composition of the present invention, the reference to component (b) means a gasoil product from an atmospheric pipestill which suitably has a boiling point in the range from about 244 to 330°C. This product is suitably present in the compositions of the present in an amount ranging from about 35-45% by weight of the total fuel oil composition.

The third essential component in the fuel oil compositions of the present invention is a light naphtha fraction (c) derived by the catalytic cracking of a heavy gasoil from an atmospheric or a vacuum pipestill. This naphtha fraction (c) suitably has a boiling point in the range from136 to 231°C and preferably component (a) and/or (b) in the fuel composition in an amount from about 5-15% by weight of the total composition. Fraction (c) suitably has an aromatics content in the range from about 60 - 75% by weight.

The fuel oil compositions of the present invention may contain in addition other conventional distillate fractions from a petroleum crude refinery process under atmospheric or vacuum conditions. These include *inter alia* components (d) to (g) described below:

(d) A fraction from a vacuum pipestill which suitably has a boiling point in the range from about 200 to 400°C, preferably from about 240-365°C. This fraction (d) is suitably present in the compositions of the present in an amount ranging from about 3-7% by weight, preferably from about 4-6 % by weight of the total composition.

(e) A fraction from an atmospheric pipestill which suitably has a boiling point in the range from about 160-380°C, preferably from about 183 to331°C. This fraction (e) is suitably present in the compositions of the present in an amount ranging from about 5 to 15% by weight, preferably from about 9 to 10% by weight, typically about 9.5-10.0% by weight.

(f) A fraction from an atmospheric pipestill which suitably has a boiling point in the range from about 230 -350°C, preferably from about 231 to 344°C. This fraction (f) is suitably present in the compositions of the present in an amount ranging from about 15 to 30% by weight, preferably from about 20-25% by weight.

(g) A fraction from an atmospheric pipestill which suitably has a boiling point in the range from about 210-420°C, preferably from about 216 to 395°C. This fraction is suitably present in the compositions of the present in an amount ranging from about 3 to 8% by weight, preferably from about 4-6 % by weight.

The fuel oil compositions of the present invention having an n-paraffin (C_{12+}) content of less than 20% by weight particularly benefit by blending with the light naphtha fraction (c). Such fuel oil compositions suitably have a cloud point of about -3 to -4°C.

The cold flow additive in fuel oil composition is suitably one that is generally available provided it is soluble in the fuel oil composition, although copolymers of

ethylene and at least one other unsaturated monomer which may be an additional mono-olefin or an unsaturated ester such as eg vinyl acetate, vinyl propionate, vinyl butyrate, ethyl acrylate and lauryl methacrylate or the like. The other unsaturated monomer can also be a mixture of an unsaturated mono-ester or diester and a straight chain or branched chain α-monoolefin. Mixtures of copolymers, such as eg a copolymer of ethylene and vinyl acetate with an alkylated polystyrene or with an acylated polystyrene, can also be used. Where the flow additive is a coolymer, it suitably consists of 1 to 40, preferably 1 to 20 and more preferably 3 to 20 molar proportions of ethylene per molar proportion of the other unsaturated monomer. The additive copolymer is suitably oil-soluble and has a number average molecular weight in the range from about 1,000 to 50,000, preferably about 1,000 to about 5,000. The cold flow additive is preferably an ethylene-vinyl carboxylate copolymer which may be selected from one or more of Paraflow®240, Paraflow® 226, Paraflow® 222, Paraflow® 275, Paraflow® 255, Paraflow® 223, Paraflow® 332, Paraflow® 209, Paraflow® 206, Paraflow® 480, Paraflow® 482, Paraflow® 479 (all ex Infineum), KF 6100S, KF 6100, KF 6301, KF 6101 (ex BASF), and DF 4842 (ex Clariant). Some of these oil-soluble additives which are eg olefin/vinyl carboxylate copolymers having a number average molecular weight as measured by vapour pressure osmometry of 1,000 to 10,000 which may optionally contain polar nitrogen compounds as co-additives, are described in EP-A-261957 and WO 94/00535.

The cold flow additive is suitably present in the oil composition in an amount from about 0.001-2.0% by weight of the total fuel oil composition.

The surprising feature of the present invention is that component (c), which is a relatively light fraction compared to the distribution of heavier components in fuel oils, is able to improve the effectiveness of conventional cold flow improvers in such fuel oils. It has been found that by using an aliquot of component (c) in the fuel oil compositions, it is possible to depress the cloud point and the temperature of operability, the latter as determined by the cold-filter plugging point (hereafter "CFPP") to a significant extent.

The present invention is further illustrated with reference to the following Examples:

EXAMPLES:

The following data was generated by subjecting a variety of fuel oils, each of which contained (i) 500 ppm by volume of an ethylene-vinyl acetate copolymer (Paraflow® 240, ex Infineum) cold flow additive and (ii) a 1050 ppm by volume of a gasoil marker dye, to a cold flow plugging point (CFPP) test. The test is described in detail in the text-book by Owen & Coley referred to above at pages 422-426 in Chapter 16.1.5. This is an IP 309 test and is also published as a European Standard by CEN, EN116:1981. Briefly, 40 ml of a sample of the test oil is cooled by a bath maintained at about -34°C. Periodically (at each 1°C drop in temperature starting from not less than 5°C above the cloud point thereof), the cooled oil is tested for its ability to flow through a fine screen in a given time period. This cold flow property is tested with a device consisting of a pipette the lower end of which is attached an inverted funnel positioned below the surface of the test oil. Stretched across the mouth of the funnel is a 350 mesh screen having an area of about 2.90 cm^2 (0.45 in^2). The periodic tests are each initiated by applying a vacuum to the upper end of the pipette whereby oil is drawn through the screen up into the pipette to a mark indicating 20 ml. The test is repeated with each 1°C drop in temperature until the oil fails to fill the pipette up to that 20 ml mark within 60 seconds. The temperature at which the last filtration commenced is recorded as the CFPP.

TABLE

Components	Fuel Composition 1* (Wt %)	Fuel Composition 2 (Wt %)	Fuel Composition 3 (Wt %)
Component (g)	4.9	4.9	4.9
Component (e)	9.9	9.9	9.9
Component (a)	16.2	8.4	5.0
Component (c)	-	7.8	15.0
Component (b)	42.2	42.2	38.4
Component (f)	21.8	21.8	21.8
Component (d)	5.0	5.0	5.0
Total	100	100	100
Cloud point (°C)	-3	-4	-4
CFPP (°C)	-8	-10	-15

The above results show that partially replacing some of the conventional gas oil components in fuel oils with light naphtha fraction from the catalytic cracking of heavy gasoil clearly improves the CFPP of the fuel oils to a significant extent.

We Claim:

1. A fuel oil composition having improved cold-flow properties, said composition comprising a cold flow additive and the following components from various pipestills of a petroleum crude refinery process:
   a. a relatively heavy fraction from a catalytically cracked heavy gasoil in turn derived from an atmospheric or a vacuum pipestill, said fraction having a boiling range of 170 to 380°C in an amount of 3 to 20% by weight and
   b. a gasoil product from an atmospheric pipestill, said product having a boiling range of 225 to 335°C in an amount of 30-50% by weight,

   characterized in that components (a) and/or (b) in said composition is at least partially replaced by at least one relatively light naphtha fraction (c) from an atmospheric or a vacuum pipestill, said light fraction (c) having a boiling range of 130 to 235°C and being present in an amount of 3 to 20% by weight, all weights being based on the total weight of the fuel oil composition.

2. A composition according to Claim 1 wherein component (a) has a boiling point in the range from 184 to 376°C.

3. A composition according to Claim 1 or 2 wherein component (a) is present in the composition in an amount ranging from about 5-18 % by weight of the total fuel oil composition.

4. A composition according to any one of the preceding Claims wherein component (b) has a boiling point in the range from about 244 to 330°C.

5. A composition according to any one of the preceding Claims wherein component (b) is present in the composition in an amount ranging from about 35-45% by weight of the total fuel oil composition.

6. A composition according to any one of the preceding Claims wherein the light naphtha fraction (c) has a boiling point in the range from136 to 231°C.

7. A composition according to any one of the preceding Claims wherein the light naphtha fraction (c) is present in the composition in an amount from about 5-15% by weight of the total composition.

8. A composition according to any one of the preceding Claims wherein the light naphtha fraction has an aromatics content in the range from about 60 - 75% by weight.

9. A composition according to any one of the preceding Claims wherein the fuel oil composition contains in addition one or more distillate fractions selected from

(d) a fraction from a vacuum pipestill has a boiling point in the range from about 200 to 400°C and is present in an amount ranging from about 3-7% by weight;

(e) a fraction from an atmospheric pipestill which has a boiling point in the range from about 160 to380°C and is present in an amount ranging from about 5 to15% by weight;

(f) a fraction from an atmospheric pipestill which has a boiling point in the range from about 230 to 350°C and is present in an amount ranging from about 15 to 30% by weight; and

(g) a fraction from an atmospheric pipestill which has a boiling point in the range from about 210 to 420°C and is present in an amount ranging from about 3 to 8% by weight,

all weights being based on the total weight of the fuel oil composition.

10. A composition according to any one of the preceding Claims wherein the fuel oil composition contains in addition one or more distillate fractions selected from

(d) a fraction from a vacuum pipestill has a boiling point in the range from about 240 to 365°C and is present in an amount ranging from about 3-7% by weight;

(e) a fraction from an atmospheric pipestill which has a boiling point in the range from about 183 to331°C and is present in an amount ranging from about 5 to15% by weight;

(f) a fraction from an atmospheric pipestill which has a boiling point in the range from about 231 to 344°C and is present in an amount ranging from about 15 to 30% by weight; and

(g) a fraction from an atmospheric pipestill which has a boiling point in the range from about 216 to 395°C and is present in an amount ranging from about 3 to 8% by weight,

all weights being based on the total weight of the fuel oil composition.

11. A composition according to any one of the preceding Claims wherein the cold flow additive is present in said composition in an amount from 0.001 to 2.0% by weight of the total fuel oil composition.

12. A composition according to any one of the preceding Claims wherein the cold-flow additive is an ethylene vinyl acetate copolymer.

13. A method of improving the cold flow properties of a fuel oil composition comprising a cold flow additive and the following components from various pipestills of a petroleum crude refinery process:

a. a relatively heavy fraction from a catalytically cracked heavy gasoil in turn derived from an atmospheric or vacuum pipestill, said fraction having a boiling range of 180 to 380°C in an amount of 3 to 20% by weight and

b. a gasoil product from an atmospheric pipestill, said product having a boiling range of 240 to 335°C in an amount of 30-50% by weight,

said method comprising replacing at least partially components (a) and/or (b) in said composition by at least one relatively light naphtha fraction (c) from an atmospheric or a vacuum pipestill, said light fraction (c) having a boiling range of 130 to 235°C and being present in an amount of 3 to 20% by weight, all weights being based on the total weight of the fuel oil composition.

ABSTRACT OF DISCLOSURE

This invention relates to a fuel oil composition having improved cold-flow properties and comprising a cold flow additive and streams from various pipestills of a petroleum crude refinery process:

a. a relatively heavy fraction from a catalytically cracked heavy gasoil in turn derived from an atmospheric or vacuum pipestill, said fraction having a boiling range of 170 to 380°C in an amount of 3 to 20% by weight and

b. a gasoil product from an atmospheric pipestill, said product having a boiling range of 225 to 360°C in an amount of 30-50% by weight,

whereby components (a) and/or (b) is at least partially replaced by at least one relatively light naphtha fraction (c) from the atmospheric or vacuum pipestills, fraction (c) having a boiling range of 130 to 235°C and being present in an amount of 3 to 20% by weight.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)	ATTORNEY'S DOCKET NUMBER P1999S007

As below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I an the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

" **FUEL OIL COMPOSITIONS WITH IMPROVED COLD FLOW PROPERTIES** "

the specification of which (check only one item below):

☐ is attached hereto.

☐ was filed as United States application

Serial No.

on

and was amended

on _____ (if applicable).

☒ was filed as PCT international application

Number **PCT/EP00/10185**

on **18 October 2000**

And was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations. § 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT indicate PCT)	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119	
GB	**9925643.0**	**29 October 2000**	☒ YES	☐ NO
			☐ YES	☐ NO
			☐ YES	☐ NO
			☐ YES	☐ NO

Combined Declaration For Patent Application and Power of Attorney (Continued)
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER: **P1999S007**

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120

U.S. APPLICATIONS		STATUS (Check One)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U S					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*List name and registration number*)

3 **Joseph J. Allocca** Registration No. 27,766 **Estelle C. Bakun** Registration No. 35,054 **Norby L. Foss** Registration ~~No.~~ 47,571

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2	FULL NAME OF INVENTOR	FAMILY NAME: COCHRANE	FIRST GIVEN NAME: Heather	SECOND GIVEN NAME: D.
0	RESIDENCE & CITIZENSHIP	CITY: ~~Cherry Hill~~ Philadelphia PA. HDC	STATE OR FOREIGN COUNTRY: ~~New Jersey~~ Pennsylvania HDC	COUNTRY OF CITIZENSHIP: Great Britain
1	POST OFFICE ADDRESS	POST OFFICE ADDRESS: ~~303 Society Hill~~ 1326 Spruce St. Apt 903 HDC	CITY: ~~Cherry Hill~~ Philadelphia HDC	STATE & ZIP CODE/COUNTRY: ~~New Jersey 08003~~ Pennsylvania 19107, USA HDC
2	FULL NAME OF INVENTOR	FAMILY NAME: CLOKE-BROWNE	FIRST GIVEN NAME: Veronica	SECOND GIVEN NAME: M.
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2	POST OFFICE ADDRESS	POST OFFICE ADDRESS: Cask House, Hazeley Road	CITY: Twyford, Hants	STATE & ZIP CODE/COUNTRY: Great Britain SO21 1PT
2	FULL NAME OF INVENTOR	FAMILY NAME:	FIRST GIVEN NAME:	SECOND GIVEN NAME:
0	RESIDENCE & CITIZENSHIP	CITY:	STATE OR FOREIGN COUNTRY:	COUNTRY OF CITIZENSHIP:
3	POST OFFICE ADDRESS	POST OFFICE ADDRESS:	CITY:	STATE & ZIP CODE/COUNTRY:
2	FULL NAME OF INVENTOR	FAMILY NAME:	FIRST GIVEN NAME:	SECOND GIVEN NAME:
0	RESIDENCE & CITIZENSHIP	CITY:	STATE OR FOREIGN COUNTRY:	COUNTRY OF CITIZENSHIP:
4	POST OFFICE ADDRESS	POST OFFICE ADDRESS:	CITY:	STATE & ZIP CODE/COUNTRY:

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203	SIGNATURE OF INVENTOR 204
Heather D. Cochran			
DATE: 7/16/2002	DATE: 8/20/2002	DATE	DATE

JJA:kak 5/15/02